

## CLAIMS

What is claimed is:

1. A conversion circuit for discriminating sourcing current and  
5   sinking current, said conversion circuit comprising:  
    a comparing circuit, comparing an error-amplified signal to a  
converted feedback signal and outputting a compared result;  
    a switch control logic circuit, receiving said compared result  
and a clock signal and generating an ON/OFF signal, wherein said  
10   switch control logic circuit   timely blanks said compared result;  
    a complementary switch circuit, enabling a corresponding  
switch circuit according to said ON/OFF signal, so as to form a serial  
loop with a sensor and an output load;  
    a converting circuit, converting a voltage of said sensor into a  
15   feedback current, wherein an enable time of said converting circuit is  
controlled by said switch control logic circuit; and  
    a voltage emulation circuit, converting said feedback current  
into a feedback voltage and shifting a DC level of said feedback voltage  
to form said converted feedback signal.  
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2. The conversion circuit according to claim 1, wherein said  
error-amplified signal is required by comparing a referred voltage and  
an output voltage, and said error-amplified signal has slope  
compensation when the duty cycle of said converted feedback signal is

bigger than 50%.

3. The conversion circuit according to claim 1, wherein said  
output load comprises a sourcing current load and/or a sinking  
5 current load.

4. The conversion circuit according to claim 1, when said serial  
loop is a sinking current output and said ON/OFF signal is in a low  
voltage status, said switch control logic circuit blanks said compared  
10 result by a next pulse of said clock signal.

5. The conversion circuit according to claim 1, when said serial  
loop is said sinking current output and said ON/OFF signal is in said  
low voltage status, said switch control logic circuit blanks said  
15 compared result before said converted feedback signal is smaller than  
said error-amplified signal.

6. The conversion circuit according to claim 1, wherein said  
enable time of said converting circuit is the same as an enable time of  
20 a corresponding switch circuit forming a sourcing current output loop.

7. The conversion circuit according to claim 1, wherein said  
DC level comprises  $1/2$  power source voltage.

8. A conversion circuit for discriminating sourcing current and sinking current, said conversion circuit comprising:

a comparator, comparing an error-amplified signal to a converted feedback signal and outputting a compared result;

5 a control logic, receiving said compared result and outputting a reset signal, wherein said control logic could timely blank said compared result;

a flip-flop, receiving said reset signal and a clock signal and generating an ON/OFF signal;

10 a complementary switch circuit, enabling a corresponding switch circuit according to said ON/OFF signal, so as to form a serial loop with a sensor and an output load;

a voltage-current converter, converting a voltage of said sensor into a feedback current, wherein an enable time of said voltage-current  
15 converter is controlled by said flip-flop; and

a voltage emulation circuit, converting said feedback current into a feedback voltage and adding a DC voltage to pull up said feedback voltage to form said converted feedback signal.

20 9. The conversion circuit according to claim 8, wherein said error-amplified signal is required by comparing a referred voltage and an output voltage, and said error-amplified signal has slope compensation when the duty cycle of said converted feedback signal is bigger than 50%.

10. The conversion circuit according to claim 8, wherein said compared result is a low voltage output when said error-amplified signal is bigger than said converted feedback signal, and said  
5 compared result is a high voltage output when said error-amplified signal is smaller than said converted feedback signal.

11. The conversion circuit according to claim 8, wherein said output load comprises a sourcing current load and/or a sinking  
10 current load.

12. The conversion circuit according to claim 8, when said serial loop is a sinking current output and said ON/OFF signal is in a low voltage status, said control logic blanks said compared result by a  
15 next pulse of said clock signal.

13. The conversion circuit according to claim 8, when said serial loop is said sinking current output and said ON/OFF signal is in said low voltage status, said control logic blanks said compared result  
20 before said converted feedback signal is smaller than said error-amplified signal.

14. The conversion circuit according to claim 8, wherein said flip-flop is an S-R flip-flop.

15. The conversion circuit according to claim 8, wherein said complementary switch circuit comprises:

5 a first MOS transistor, wherein a drain of said first MOS transistor connects to a power source voltage;

a second MOS transistor, wherein a drain of said second MOS transistor connects to a source of said first MOS transistor to form a output, and a source of said second MOS transistor connects to a signal ground; and

10 an inverter, wherein an output of said inverter connects to a gate of said first MOS transistor, and an input of said inverter connects to a gate of said second MOS transistor.

15 16. The conversion circuit according to claim 15, wherein said enable time of said voltage-current converter is the same as an enable time of said first MOS transistor.

17. The conversion circuit according to claim 8, wherein said sensor comprises a resistor.

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18. The conversion circuit according to claim 8, wherein said DC voltage comprises  $1/2$  said power source voltage.